



"Plants for the Northland"

2001/2002 Northland News

USDA-NRCS Plant Materials Center

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Sweetgrass For Culture and Conservation



Herbal garden with sweetgrass. Note braids and basket in foreground.



Sweetgrass is a cool-season native species that flowers in early May and spreads aggressively by rhizomes.

Sweetgrass for Culture and Conservation

As you walk through a wet meadow on a warm day in May, a sweet vanilla-like aroma wafts in the air. The only flower in sight is a seed head in bloom on a very leafy grass. But, how can this be? What blooms this early and has a scent too? Hmm. Sweetgrass, *Hierochloa odorata* is probably the grass you smell and see. Sweetgrass, also known as vanillagrass, Mary's grass, holy grass, and Seneca grass, is one of the earliest blooming cool-season perennial grasses. Not only will you find it in low prairies, you will see it in wetlands, riparian areas, slough and marsh edges, and cool mountain canyons. It's native to most of the Northern Hemisphere throughout the world. The plant has very long leaves with little or no stems, and is very rhizomatous. The seed head is a pyramid shaped panicle that is often hidden by the long drooping leaves. Although it flowers, don't expect to find many viable seeds.

What about the fragrance? The plant is scented by coumarin found in its leaves. Coumarin is a natural compound also found in sweetclover and is a natural blood anticoagulant.



Sweetgrass demonstration planting

Sweetgrass has been used for centuries by the Native Americans for ceremonial and medical purposes. The long leaves (up to 30 inches) are dried, braided, and burned as incense and used as a smudge for various purification and spiritual ceremonies. It has been used as a hair, body and eye wash. It has also been used for cough treatment and in childbirth. Various tribes have used the grass in basketry and as a sachet.

Sweetgrass could be a great plant for riparian restoration. Its extensive rhizomes and moisture tolerance make it useful for erosion control, including hillside seeps. The aggressive nature of the rhizomes, however,

could make it invasive on sites with no competition such as flowerbeds and gardens.

A central North Dakota collection of sweetgrass (9063128) is growing at the PMC. This bed is used as a source for digging rhizomes to distribute for demonstration plantings and cultural exchange. In the past few years, potted plants have been sent to various tribes and other folks in hopes that they can start a bed of their own and share the plants. Recently, a variety named 'Radora' was released from South Dakota State University, by Dr. Arvid Boe. The source population for Radora was a natural stand in a mesic prairie near Brookings, South Dakota.

Some great references are available on sweetgrass. The Plants database, accessible at <http://plants.usda.gov>, is a good place to start. When searching for this species in the Plants database, use vanilla grass as its common name. You will find a fact sheet, a planting guide, along with other species information.

Nancy Jensen, Agronomist

FEPs - the Heart of the PMC Program

A commonly used acronym at the PMC is 'FEP,' or Field Evaluation Planting. These FEPs are the heart of the PMC program. Most of them are located away from Bismarck, scattered in the three-state region (see map on inside of the back page). These sites have a variety of soils and climates. Most of the plants examined by the PMC, whether grasses, or trees and shrubs, are planted at one of these locations. Only by observing and measuring the growth of these test plants over a number of years is the staff able to select the best plants for conservation use. The spring planting and fall evaluation trips are a very important part of the workload at the PMC. The FEPs near Bismarck are maintained (cultivated, mowed, etc.) by the PMC staff. The sites at greater distances are maintained by the landowner or various cooperators. Most of these FEPs are on publicly owned land, such as State experiment stations.

During the testing and measuring process it is important to keep each seed source separate, to retain its identity. Each individual seed source is referred to as an accession, and is assigned its own accession number, which stays with that plant, and is used to track its performance throughout the evaluation period.

Michael Knudson, Forester

Five Myths Concerning Native Grass Varieties

What seed source is better for native grass seedlings; local populations, or varieties, or something in-between? One answer that I believe most people would agree with is that it depends on the objective(s) of the planting. Multiple objectives may cloud the issue, but providing clear and definitive objectives generally will lead you to the best answer. For example, germplasm preservation may be a primary objective for planting seed from remnant local populations; and wildlife cover may be a primary objective for planting a variety proven to provide good biomass and a minimum amount of lodging over winter.

Varieties or Natural Germplasms are sometimes not used because of misinformation associated with the development and release of native plant materials. Natural Germplasm is plant materials that has not been manipulated or significantly altered from the original collection. Some of this misinformation is presented in the following five myths regarding native grass releases.

1. Varieties of native grass are too aggressive and do not perform well in mixtures.

Certain species are aggressive on specific sites and can become dominant. For example, Rodan western wheatgrass planted as part of a mixture, may dominate a clayey site after several years. However, it is the strong adaptation of the species to that site that may be undesirable and not the performance of the variety Rodan. Switchgrass, especially the lowland types, can become overly competitive on some wet sites. This is generally more of a species/site issue rather than a seed source issue. Seeding a balanced mixture of species suited to the site is a good start. Species dynamics over time is highly correlated to environmental conditions and management schemes.

2. Varieties of native grass will not produce seed because they are too competitive and will remain vegetative.

This misunderstanding probably got started years ago when more southern (Nebraska, Kansas) varieties of warm-season grasses were being used in the Dakota's and Minnesota because of the unavailability of more northern sources. These southern sources were late maturing, and often remained vegetative and did not produce seed, especially during dry conditions. Northern source varieties and Natural Germplasms are now available. These northern sources are early maturing and produce excellent seed crops.

3. Varieties of native grass are Genetically Modified Organisms (GMOs).

I am not aware of any native grass varieties that are GMOs. Although the extent of selection varies, all of the native grass releases being produced at the Bismarck

PMCs originate from natural populations. New releases are more genetically diverse than previously and are no longer called varieties. Native grasses are now generally being released as Natural Germplasms. Itasca Natural Germplasm little bluestem is a regional collection with 72 different sources (site collections) of parent material comprising its genetic background. Bad River Ecotype blue grama originates from native seed harvest and has had no intentional selection or purposeful genetic manipulation.

4. Varieties of native grass do not perform as well as sources from local populations and will not persist.

Proven varieties generally perform better than local populations in terms of ease of establishment, seedling vigor, disease resistance, biomass yield, seed production, and reduced lodging because of initial selection and extensive field testing. These are all very important plant traits which benefit wildlife habitat and conservation cover. Varieties must be field-tested and have their performance documented prior to formal release. Persistence or life span of adapted varieties is no less than sources from local populations.

5. Genetic diversity of the species is decreased when using native grass varieties or Natural Germplasms.

A single variety or Natural Germplasm release will not completely represent the genetic diversity present in the species, but a small population of plants that trace to a single site or a limited number of sites (local populations) may have an extremely narrow gene base and high genetic vulnerability. It is also true that some varieties were developed primarily for forage benefits and may have been selected for a relatively narrow range of traits. However, current procedures used by most PMCs for release of native grasses or other species guard against low genetic diversity. Plants used in a new release are collected over a fairly wide range of environments. New regional releases from the Bismarck PMC contain more genetic diversity than would sources from a limited number of isolated local populations. Release categories for Natural Germplasms that are eligible for seed certification include "source identified", "selected", and "tested". The "selected" category refers to limited phenotypic selection and does not encompass intensive recurrent selection. In nature, plant selection is an ongoing ecological process and whenever seed is harvested from any source, plant selection is occurring. Finally, developed seed sources will occupy only a very small proportion of the total plant population that exists for the species. As such, any outcrossing with plants of the same species that are indigenous to a local area would have low impact on genetic diversity of that species in most instances. Local populations where inbreeding depression is a concern would benefit from outcrossing of these genetically diverse Natural Germplasms.

Dwight Tober, Plant Materials Specialist

Direct Woody Seeding Trial

The restoration of native habitats and the continuous Conservation Reserve Program (CRP) enrollment may include the use of woody plant materials. Shrubs are a minor component of the prairies. Shrubs occur naturally on the border of wooded areas and may extend far into the grasslands along draws and in landscape depressions.

Typically, woody plantings are established using bare root or containerized seedlings. An alternative to using seedlings is to plant shrub seed directly into a prepared seedbed or into a stand of grass. This technique has been used with success in Iowa and southern Minnesota. Advantages of direct seeding include no transplant shock to seedlings and potentially



Leadplant seedlings at the prairie restoration study in Sheridan County, ND

reduced costs compared to seedlings. Some disadvantages may be unavailability of high quality seed and difficulty with weed control. The seed of most woody species needs to go through a period of stratification before it will germinate. The type and degree of seed dormancy varies considerably between species. Growing conditions may not be suitable for proper seed stratification and germination, resulting in poor establishment.

Recently, the PMCs at Bismarck and Manhattan, Kansas, started studies to measure the success of planting tree and shrub seed. This fall, the Manhattan PMC dormant seeded green ash, sycamore, black walnut, bur oak, red oak, and pecan into a prepared seedbed. In 2000, the Bismarck PMC helped establish a similar type of planting on a Emergency Watershed Protection (EWP) site near Walhalla, North Dakota. The species planted were basswood, bur oak, green ash, hackberry, birch, chokecherry false indigo, and ironwood. A second planting was drilled into grassland

along the McClusky Canal in Sheridan County. Five native shrub species, buffaloberry, chokecherry, rose, snowberry and leadplant were planted.

Dr. John Weaver worked as a Plant Ecologist in Nebraska for many years. In the period of the 1920s and 1930s, he kept track of the advance and retreat of woody plants in a prairie setting in the central plains. He noticed that the woody plants encroached upon the grasslands in the wetter years. After a series of dry years, the woody plants disappeared from the grasslands. Weaver stated that, "it appears fairly certain that there can be no final victory for either; there can be only periods of varying duration in which prairie or forest holds the ground won by the favor of the changing climatic cycle."

Michael Knudson, Forester

Long Range Plan Updated

The Plant Materials staff met with representatives from North Dakota, South Dakota, and Minnesota to discuss current and future priority conservation issues facing NRCS. The day was spent discussing each state's conservation needs and priorities and finalizing these issues into a long range plan that the Bismarck Plant Materials Program uses in determining workload and product needs of the agency for the next 5 years. See page 13 for the 2001-2005 Bismarck PMC Long Range Plan.

Wayne Duckwitz, PMC Manager

Native Forbs

The availability of forb seed for planting is limited in the Northern Great Plains. While many species are native to the area, few have been grown for seed increase. The PMC is striving to release genetically diverse forb selections adapted to South Dakota, North Dakota, and Minnesota. This would make a consistent supply of seed and a wider variety of native species available for prairie restoration, range and pasture seedings, and prairie landscaping.

In 2000, five native forbs were released from the PMC. These are available for seed increase and some are available in the seed trade. The releases are listed below. Planting Guides and Seed Growers' Guides are available from the PMC for these species.

The PMC has also been working with leadplant (*Amorpha canescens*), and silky prairie clover (*Dalea villosa*). Collections were

made a few years ago and small evaluation blocks were planted. Small seed harvests have



been taken from these blocks. Establishment of leadplant using bareroot stock is also being evaluated through the field testing program. Both species are native legumes that prefer sandy sites.

A forb we collected this fall for evaluation and potential release was shell-leaf penstemon (*Penstemon grandiflorus*). It is quite showy with its waxy leaves and unique lavender/pink flowers. It prefers sandy soils of hillsides and roadcuts and has fair forage potential. In the fall of 2001, seed was collected in South Dakota, North Dakota, and Minnesota. A field plot at the PMC will be planted in 2002. Growth characteristics, seeding rates, weed control, and growth potential will be evaluated.

Antelope Germplasm	Slender white prairieclover (<i>Dalea candida</i>)
Bismarck Germplasm	Purple prairieclover (<i>Dalea purpurea</i>)
Bismarck Germplasm	Stiff sunflower (<i>Helianthus pauciflorus</i>)
Medicine Creek Germplasm	Maximilian sunflower (<i>Helianthus maximiliani</i>)
Bismarck Germplasm	Narrow-leaved purple coneflower (<i>Echinacea angustifolia</i>)
NOT RELEASED	Leadplant (<i>Amorpha canescens</i>)
NOT RELEASED	Silky prairieclover (<i>Dalea villosa</i>)
NOT RELEASED	Shell-leaf penstemon (<i>Penstemon grandiflorus</i>)

Nancy Jensen, Agronomist

Big Bluestem for High Quality Summer Forage

Most livestock producers already have adequate cool-season pasture for early and late season grazing. What about mid-summer? Northern adapted varieties of big bluestem are now available for use in summer grazing. Big bluestem can provide large quantities of high quality forage in July and August when cool-season species such as bromegrass and

intermediate wheatgrass go through summer dormancy and rapid decline in digestibility and crude protein. Recent studies conducted at the NDSU Hettinger Research Experiment Center in southwest North Dakota have shown Bison big bluestem to test 13.3 percent crude protein and 72 percent dry matter digestibility in late June. Peak oven dried forage production was almost 6,000 lbs/ac. A comparable study at Hettinger showed Oahe intermediate wheatgrass at the same time to test 6.9 percent crude protein and 59 percent dry matter digestibility. Peak oven dry forage production was 2,733 lbs/ac. Warm-season grasses such as big bluestem start growing at temperatures near 55 degrees F and grow best at temperatures of 80-90 degrees F in mid-summer. Inclusion of warm-season grasses in a grazing system allows cool-season grasses a rest period in mid-summer, which improves their vigor and enhances forage production for late summer and fall.

Origin and phenology for recommended varieties of big bluestem for North Dakota, South Dakota, and Minnesota.		
Variety	Origin	Days to Seed Ripe after July 15 (avg.)
Bison	central ND	60
Bonilla	east central SD	80
Sunnyview	south East SD	90
Champ	IA/NE	95
Rountree	west central IA	100
Pawnee	central NE	105

Producers desiring high quality forage should harvest at boot stage (immediately before seedheads emerge) and graze to a 6-inch stubble height. Stocking density should be high enough to use most of the grasses before the stems develop. Rotational grazing is recommended to reduce trampling and enhance utilization. Harvest at heading will often result in greater yields but forage quality will be lower. For hay production, big bluestem should be harvested at boot stage, leaving a 6-inch stubble.

Seed prices have recently come down for big bluestem. Certified seed is recommended and often does not cost anymore than non-certified. The recommended seeding rate varies from about 6 to 8 PLS lbs/ac. The higher rate is used in Minnesota and the eastern Dakota's or on sites with more favorable moisture conditions, and the lower rate is used in the western

Dakota's. Check with your local NRCS field office for recommended varieties in your area. Big bluestem performs best on silt and silt loam soils. Under favorable management, excellent stands can be maintained for 20 years or more. Seed prices are down for big bluestem! Now is the time to establish a high quality forage base of big bluestem for long-term summer grazing!

Dwight Tober, Plant Materials Specialist

Foundation Seed Production at Your Plant Materials Center, What is It Worth?

Have you ever wondered what happens to the seed that is grown at the PMC and what it is worth? After the seed is cleaned and tested, Dwight Tober, Plant Materials Specialist, allocates the seed to commercial growers. Last year (2001), twenty different species/varieties were grown and distributed to 25 different commercial seed growers. Seed growers then plant, harvest and sell seed on the commercial market. This is the seed that becomes available to producers within your county for conservation plantings.

To give you an idea of how this works, let's look at an example. In 2000, a five-acre foundation field of Lodorm green needlegrass produced 556 PLS pounds. Of this amount, 535 PLS pounds were distributed to six commercial growers in 2001. Those six growers collectively planted approximately 150 acres of certified seed fields. Assuming these fields had an average harvest of 100 lbs/ac dryland production, 15,000 pounds of seed was potentially available for use by producers within your counties.

What is the economic importance of this? If you figure that ND Foundation Seedstocks sold foundation seed of Lodorm for \$15/lb, that generated sales of \$8,000. The commercial value of production from this original foundation seed would have been 15,000 pounds produced times an average price of \$6 /lb PLS. This generated approximately \$90,000 of sales into the economy. Take this one step further and this same 15,000 pounds of seed if planted at an average seeding rate of 7 lbs/ac would have covered 2,143 acres of land. Putting a dollar figure on the conservation benefits is more difficult considering the multi conservation uses the planting would provide. One year of production resulted in more than \$90,000 that was generated from the 535 pounds of Lodorm green needlegrass processed at the Bismarck

PMC. Commercial production of all plant releases produced at the Bismarck PMC for 2001 is estimated at \$8,142,419. Commercial production from plant releases from the 26 PMCs located across the United States had a total commercial value of \$122,269,584 for the year 2000. The long-term goal of the plant materials foundation seed production program is to help provide a steady supply of quality seed that is available to be used to solve conservation problems.

Wayne Duckwitz, PMC Manager

Propagation Protocols for Natives

The Plant Materials Program has teamed up with the National Park Service, the Native Plant Journal, and various other partners to develop a propagation protocol library of various native species. A propagation protocol tells you how to propagate a specific species. As of December 2001, approximately 900 protocols of more than 1400 species were available for viewing on the Native Plant Journal website at <http://nativeplants.for.uidaho.edu> Click on "Search the Protocol Database" to access the plant search capability. You can even register as a propagator and add your own protocol to the database by clicking on "Add/Edit your Protocols". This site provides a tremendous information resource for many species where propagation was previously unknown, or at least unrecorded.

Dwight Tober, Plant Materials Specialist

Switchgrass Toxicity/Photosensitivity in Horses, Sheep, and Goats

Switchgrass has been reported to be toxic to horses and sheep in a recent article in the Journal of Natural Toxins (Vol. 10, No. 4, 2001). Staff of the USDA Agricultural Research Service, including the Poisonous Plant Research Laboratory at Logan, Utah, authored the article. Other sources have reported switchgrass to also be toxic to goats. Diosgenin was identified as the poisonous toxin that caused the photosensitivity and affected internal organs and liver function. Problems identified so far have been with animals grazing pure switchgrass. No problems were noted for cattle.

Dwight Tober, Plant Materials Specialist

OWLS Project

The outdoors can be a great place for a classroom. So thought the Biology Class and FFA at the Hettinger Public School. Instead of

dreaming, they took action to construct such a place. It isn't your ordinary classroom with bricks and mortar. This one has dirt for the floor and sunshine for light. In 1999, students at the school planned and designed plantings of grasses, forbs, trees and shrubs at a single location. The plantings will provide a place for



Students plant forbs and grasses at the outdoor classroom.

students and the public to learn to identify plants, study their growth, and observe wildlife. The plantings are divided into sections according to their plant type. All plants will be planted into chemically killed sod that is covered with fabric weed barrier. Tree planting began in 2000. The first forbs and grasses were planted in 2001. The planting is ongoing with new species being planted each year for the next few years. All material will be marked with identification signs, making self-guided touring easy.

The cooperative spirit for this project has been strong. The North Dakota Game and Fish Department, through a special program called OWLS (Outdoor Wildlife Learning Site) helped with initial funding. The Hettinger Research and Extension Center and Tom Shirek, a private landowner, provided land. Dakota West RC&D provided funding for signs and the purchase of trees. The Adams County SCD has provided the weed barrier and assistance in obtaining and planting the woody and vegetative materials. The PMC is providing grass plugs and forbs. Support has also been provided by the NRCS Wildlife Habitat Improvement Program.

A learning project, a learning classroom.

Nancy Jensen, Agronomist

Specialist's Comments

The Plant Materials Program is becoming more visible. A number of factors are

responsible for this change, including a renewed emphasis on technology development; improved information/computer technology; CRP and other revegetation programs; increased emphasis/interest in native plants; increased emphasis on outreach for underserved clients; new partnerships with other groups/agencies; and new urban conservation opportunities. The Bismarck PMC recently updated their Long Range Plan for 2001-2005. Additional high priority needs that were identified included Filter Strips/Nutrient Management, Urban Conservation, Alternative Income Plants, and Information and Education. About half of the existing workload at the PMC supports the production of foundation equivalent seed/plants for 35 plant releases. The demand for foundation seed, primarily native species, is at an all time high. Most seed requests from commercial growers for the native releases are put on a 1 to 2 year waiting list. Seed production at the PMC is currently at full capacity with no room for expansion. A new partnership has been implemented with the NDSU North Central Research Center at Minot, North Dakota, for foundation seed production of several releases, with opportunity for expansion. Other agencies, including the USDA Forest Service and the USDI Bureau of Land Management are interested in developing their own native plant materials programs. There will be opportunities for joint efforts and great potential for high impact regional and national conservation benefits.

Field Plantings

There are about 150 active field plantings in the three states. I would like to say thanks to all the dedicated field office staff that take notes and evaluate the plantings every fall! This information is invaluable when the time comes to release these new plant materials. These evaluations provide the guidance that we need to make all the technical recommendations that are required for a new plant.

Plant materials available for field plantings in 2002 include leadplant for prairie landscaping, and wildlife plantings; and black chokeberry for farmstead windbreak and wildlife plantings. There is still a high level of interest in the sweetgrass, but I already have enough field plantings. The decision was made to continue offering sweetgrass as a special planting for outreach efforts.

Special Plantings for Demonstration

There were about 25 special plantings last year that included a wide array of species. The purpose of the plantings varied considerably and included outdoor classrooms, lakeshore stabilization, tribal seed increase, toxic salt reduction, riparian area benefits, critical area stabilization, and prairie landscaping.

Field Evaluation Plantings

Appreciation is also expressed to those field office personnel, both District and NRCS, that assist, usually twice a year in the spring and fall, with the planting and evaluation of the long-term Field Evaluation Plantings (FEPs). We currently have 14 FEP sites identified in the three states. The newest is the Agroforestry FEP at Staples, Minnesota, cooperative with Central Lakes College and the University of Minnesota. Two FEPs were recently terminated and include the sites at Crookston, Minnesota (begun in 1980), and Rochester, Minnesota (begun in 1984). Both evaluation plantings provided valuable information on new woody plant material being tested; and were instrumental in contributing important documentation data to support the release of several new varieties including McDermand Ussurian pear, Homestead Arnold hawthorn, Regal Russian almond, and Legacy late lilac. The site at Rochester also provided for a 6-year replicated evaluation of 32 warm-season grass accessions/varieties of seven different species. Data collected from 1984 to 1991 included the most extensive phenology information on warm-season grasses ever compiled for warm-season grasses in southern Minnesota. This information was used as baseline data for determining warm-season variety recommendations for southern Minnesota. This data also helped support the release of several new grass varieties including Forestburg and Dacotah switchgrasses; Bison, Bonilla and Sunnyview big bluestems; and Tomahawk Indiangrass.

Dwight Tober, Plant Materials Specialist

Maintaining Health of Our Linear Forests

Soil health, plant health and rangeland health are popular topics. How about 'forest health?' What is a healthy forest? Our shelterbelts are sometimes referred to as 'linear forests.' How can we keep them healthy? One hundred years ago Samuel Green wrote in his book, Forestry in Minnesota that "one of the

greatest drawbacks to plantings made up entirely of one kind is the fact that drouth, insects or fungus disease may destroy the whole planting at one time, while in a judiciously mixed planting this could hardly occur."

In the past century, many windbreak monocultures have been planted in the Northern Plains. Many of these have since died. Most of our tree species are subject to insect and disease damage. By alternating or mixing species in a row and between rows, healthier windbreaks can be established and maintained. Some studies have shown that by mixing poplar species within rows, the incidence of disease has been reduced. In Denmark, many miles of shelterbelts have been planted. The Danish tree planters commonly mix three or four species per row. Some short-lived, faster growing species ('nurse trees') are mixed with slower growing, long-lived species. Over time, the plants sort themselves out. The Danes feel that this leads to healthier windbreaks. Healthier windbreaks should result in longer-lived windbreaks.

Michael Knudson, Forester

Chokeberry, Leadplant and Echinacea?

You may wonder what these native plants have in common. The answer is they are all being evaluated at the new Agroforestry Demonstration at the Central Lakes Agricultural Center at Staples, Minnesota. Some of the other species included in the evaluation include prairie cordgrass, sugar maple, sweetgrass, hazelnut, nanking cherry, and various poplar species/clones. The main objective of the planting is to demonstrate the potential of various conservation plants for alternative income crops on highly erosive high water table sands. Fruit for jams, jellies, and wine; native seed for prairie restoration; and sweetgrass braids for cultural exchange all add up to a very interesting and unique demonstration area. Various woody and herbaceous species are being planted as single-row wind barriers with high value alley crops between the barriers. Echinacea was the first crop seeded last October as part of a native seed workshop. Approximately 10 participants helped thresh prairie cordgrass seed and plant Echinacea as the field demonstration portion of the workshop. Staff from the Bismarck Plant Materials Center provided information on seed production and processing of various native species. Mike Demchik is the Extension Educator on staff at the Agricultural Center responsible for the

cooperative project. Feel free to stop by for a visit if you are in the area. Mike has done an excellent job providing signs and information on site that will assist you on a self-guided tour.

Dwight Tober, Plant Materials Specialist



Mike Demchik shows fruit harvested from 2-year old chokeberry at the Staples Agroforestry Demonstration.

Wetland Species

Revegetating around wetlands and riparian areas can be a big challenge. The PMC is currently working with a few plant species that offer potential in this arena.

Slough sedge (*Carex atherodes*)

Slough sedge is a very leafy, rhizomatous, cool-season, grasslike plant that grows in wet meadows, wetlands, and riparian areas. Thanks to various folks in the field, seed was collected in 1997 from plants in North Dakota, South Dakota, Minnesota, and Canada. Plants were propagated from this seed and planted to a PMC field where they were evaluated for a few years. Seed was harvested from plants in this field that set seed, were vigorous, and were leafy. This seed was propagated and in 2001, plants were assembled to start a seed increase field. In the next few years, we hope to get seed out to seed producers, who in turn will make it available for public use. While the process sounds easy, we've hit a few obstacles along the way. First, seed set is poor. Second, seed dormancy in *Carex atherodes* prevents it from sprouting. We have scratched its coat, soaked it in hot water, and tried different growing temperatures. While we have produced a few plants, no method has been very successful. We are presently studying a fall, dormant seeding. As *Carex atherodes* would rather grow rhizomes and spread, we are also testing rhizome plantings. We planted

dormant rhizomes this past fall and plan to plant actively growing rhizomes this spring.

Prairie cordgrass (*Spartina pectinata*)

This is a strongly rhizomatous, robust, leafy warm-season grass of wet and sometimes salty sites. Red River Germplasm, released a few years ago by the PMC, is available in the commercial seed trade. Recently, we have been asked about longevity of seed storage. While we have no definite answers, we have observed seed lots that drop considerably in germination after two or three years in temperature and humidity controlled storage. This should be a caution when storing seed of this species.

The PMC is also testing the planting of vegetative material, specifically rhizomes. Rhizomes dug in early spring have been successfully planted by hand or using a tree planter. This could be a way to vegetate areas or start a seed increase field. In a field planting near Grand Forks, cordgrass rhizomes, dug in the spring, were planted by hand to a riparian site governed by the Wetland Reserve Program. In another planting, we are testing success of digging and planting dormant rhizomes in late fall. We should have some results by next year. The PMC is also looking at the success of storing rhizomes in refrigeration over the winter.

Cupplant (*Silphium perfoliatum*)

Cupplant stands 40 to 80 inches tall, has coarse square stems, and leaves that form a cup around the stems. The plant grows from a fibrous crown or short rhizomes. It is native in lowland prairies and open woodlands of various parts of the eastern and northern United States, including extreme eastern South Dakota, eastern North Dakota, and parts of Minnesota. Dr. Arvid Boe, and his graduate student, Paula Loewe, of South Dakota State University, are currently studying the basic growth and biology of the plant and determining genetic variations. Two test sites are in South Dakota, and one site is at the Bismarck PMC. The Bismarck site offers a place to study winter hardiness and performance under drier climatic conditions. Data was gathered in 2000 at all sites. In 2001, hail in June severely damaged plants at the PMC site. Future plans include field plantings to study buffer and other conservation potentials, forage value, and biomass production.

False Indigo (*Amorpha fruticosa*)

A native warm-season legume, this shrub species doesn't leaf out until late spring but has good growth rates on suitable sites. It likes low-lying areas that receive additional moisture, or streambanks and shorelines. It is generally regarded as a "first choice" woody species on streambank/shoreline stabilization projects. It has a dense fibrous root system that anchors sand very well, even better than sandbar willow. Height varies from 6 to 12 feet depending on the site and competition with other plants. A field planting review conducted in South Dakota last summer indicated high survival and good growth rates for false indigo, even in some instances where competition such as smooth brome grass was quite heavy. A planting being evaluated by the field office last spring in Brookings, South Dakota, showed that mice had completely girdled all the stems near the base of the plant and all the upper growth had died-back. An evaluation of the same plants conducted in early August showed new growth sprouting from the base of each plant averaging about 6 feet in height! The species is subject to natural dieback on occasion, but usually the plants will resprout. False indigo will also spread by layering and seed regeneration. **Conservation nurseries in the three-state area are producing this species.** The origin of accession 9008041 being tested by the PMC is Idaho. It is larger and more vigorous than local sources.



Sandbar willow and false indigo provide streambank stabilization near Parker, South Dakota. Note untreated area in the background.

Sandbar Willow (*Salix exigua*)

Sandbar willow is a strongly suckering native shrub that provides dense vegetative cover when good weed control is practiced. This

species does not perform well with competition. It prefers wetter sites and is a logical choice for wetland restorations where shrubs are desired, and weeds are controlled at least initially. This species also performs well on streambank/shoreline stabilization plantings. Height varies from 6 to 15 feet depending on site conditions. This species is also subject to dieback, but usually regenerates quite quickly by suckering. A field planting review completed this summer in South Dakota resulted in good survival and high stem densities where competition was controlled. **Conservation nurseries in the three-state area are also producing this species.** The origin of accession 9035212 being tested by the PMC is northern Iowa.

Nancy Jensen, Agronomist

Hawthorn and Deer Repellents

Homestead hawthorn was released in 1993 for use in wildlife plantings, as well as farmstead and field windbreaks. In spite of its thorns it has also been used in urban plantings. This small tree was first collected near the Arnold Arboretum in Massachusetts. Hence its name, Arnold hawthorn. It was first brought to North Dakota by John McDermand in 1954, by way of the Morden Arboretum at Morden, Manitoba.

Its vigorous, dense growth makes it useful for all types of plantings, while its rounded form and colorful white flowers and red fruit make it attractive as an ornamental. In a row or block planting with uniform soils, the plants tend to be quite uniform in size and shape. Many birds utilize the tree for food and nesting cover.

One drawback to the hawthorn is that deer and rabbits prefer to browse it. Many of the older trees take on a "mushroom" form after the deer have browsed back all the lower branches. The U.S. Forest Service recently published the results of a study of a wide variety of repellents. The results indicate that the most effective repellents are those that give off sulfurous odors such as egg or slaughterhouse waste. Repellents that use bittering agents to repel have proven ineffective while those containing active ingredients causing pain or irritation are probably not at concentrations high enough to be effective. The four most effective products (active ingredients are listed in parentheses) and manufacturers are:

- 1) Bye Deer, Security Products, Phoenix, AZ (sodium salts of acids)

- 2) Deerbuster's Deer Repellent Sachets, Trident Enterprises, Fredrick, MD (meat meal & red pepper)
- 3) Get Away Deer & Rabbit Repellent DRR, IntAgra, Inc., Minneapolis, MN (Capsaicin and isothiocyanate)
- 4) Deer Away Big Game Repellent Powder, IntAgra, Inc., Minneapolis, MN (putrescent whole egg solids)

Recently the PMC has been using a new product called 'Plantskydd', which was listed as moderately effective in the Forest Service study. This product has been used on purple prairie clover and on chokeberry. Initially, the repellent may have kept the browsers away, but now it seems that the deer and rabbits are no longer bothered by it. When plants like hawthorn and chokeberry are used in wildlife plantings, repellents may be necessary.

Michael Knudson, Forester

Opportunities For Growing Grass Seed

As commodity prices continue to fall, farmers and ranchers are looking for alternative crops to add diversity and increase income for their operations. Grass seed production may offer such an opportunity. Though seed sale returns can be attractive, grass seed production does not fit everyone's operation. It is a high value commodity with fluctuating demand and prices. Grass seed production, however, can be a very rewarding enterprise. Initial planning is a key to success. Following are some essential questions you need to ask or consider before delving into grass/forb seed production.

1. What species do I want to raise? A better question is what species can I raise given my soil, moisture and other climatic conditions that I am faced with?
2. Should I raise native grasses, introduced grasses or how about some of those native forbs or wildflowers that everyone is talking about?
3. Cool-season or warm-season species? How much time does it take?
4. What equipment do I need? Should I plant it in rows or solid seed my fields?
5. What weed problems will I be faced with and are chemicals available?
6. Where can I clean my seed?
7. What species are in demand and where can I market my seed?

If you have any producers in your counties interested in a challenging alternative crop of

grass or forb seed production, staff at the PMC would be glad to visit with them and help answer any questions.

Wayne Duckwitz, PMC Manager

Training Highlights at the PMC

Training was offered in 2001 for NRCS staff and partners. Twenty-three participants from the three states attended the three-day training session. The training focused on plant issues



Participants receive plant identification training at the PMC's grass garden

facing field staff and how the plant materials program can assist in these efforts. Numerous field activities provided valuable hands-on training. The small class size allowed for good discussion and interaction among participants. We plan to continue offering this training annually and look forward to meeting staff from the three states. If you have an interest in plant materials and would like to attend one of these training sessions, please visit with your supervisor and get your name on the list. We would be glad to send you last year's agenda to give you a better feel for what is actually offered in the course.

Wayne Duckwitz, PMC Manager

Websites New and Improved

Both the PLANTS database website and the Plant Materials Program homepage website are new and improved. If you haven't used either lately you should give them a try. I'll make a few comments on a small portion of what's new.

<http://plants.usda.gov>

As the recipient of numerous awards, the PLANTS database continues to add new links and advanced query capabilities. New and updated fact sheets and planting guides are being added on a regular basis. I like the PLANT links on the cover page. Click on this and you will have many links from which to

choose. Two of my favorites are “Plant Photos”, and “Native Plants and Gardening.” You should also check out some of the new information and links available at the species level. A good species to use for a trial run is switchgrass because there are numerous links. Enter switchgrass as a common name and the search begins. You will then have several scientific names from which to choose. Select *Panicum virgatum* and the information screen will appear. Plant characteristics will give you technical species information such as seeds per pound, pH range, salinity tolerance, and growth form. The plant fact sheet provides general establishment and management information such as seeding rate, varieties, and recommended soil types. If you continue to scroll down you will find a distribution map, invasiveness information, and wetland indicator status. If you scroll all the way down you will

see related websites. I found these additional sites very useful and especially liked the Canadian Rangeland Fact Sheets, and the University of Minnesota Images.

<http://Plant-Materials.nrcs.usda.gov>

The Plant Materials Program homepage has been under construction for a while but that process has been completed. Some of the new and improved functions include many more accessible publications, numerous related websites, and probably the biggest change is the addition of a search capability. Publications can now be queried by PMC location or by topic. Related websites can be accessed by a lookup table of subject areas. Individual PMCs also have more of their technical information available. Click on the Bismarck PMC and see what’s new!

Dwight Tober, Plant Materials Specialist

Certified Seed/Plant Prices – January 2002

The following prices have been established for certified grass seed/plants produced at the Bismarck Plant Materials Center. **This seed is for sale to commercial growers through North Dakota State University for the express purpose of certified seed production.** The cost is per Pure Live Seed (PLS) pound. Shipping costs of 50 cents per pound will be added to the total. A confirmation order will be sent from the Plant Materials Center. The buyer will be billed from the North Dakota State University Foundation Seedstocks Program at Fargo, ND. **Payment in full must be received before seed will be shipped.** Payment must be received within 30 days or the order will be cancelled. For ordering information, please contact Dwight Tober by e-mail at dwright.tober@nd.usda.gov or phone (701) 530-2075.

RELEASES	CLASS*	COMMON NAME	COST/PLS LB
Native Grasses			
Badlands ecotype	select (G2)	little bluestem	18.00
Bad River ecotype	select (G2)	blue grama	16.00
Bismarck ecotype	select (G1)	buffalograss (vegetative 3-inch plugs)	.50 per plug
Bison	foundation	big bluestem	10.00
Bonilla	foundation	big bluestem	10.00
Dacotah	foundation	switchgrass	4.00
Forestburg	foundation	switchgrass	4.00
Lodorm	foundation	green needlegrass	10.00
Mandan	foundation	Canada wildrye	10.00
Pierre	foundation	sideoats grama	15.00
Red River	select (G1)	prairie cordgrass	75.00
Rodan	foundation	western wheatgrass	5.00
Tomahawk	foundation	Indiangrass	14.00
Introduced Grasses			
Mankota	foundation	Russian wildrye	5.00
Nordan	foundation	crested wheatgrass	4.00
Manska	foundation	pubescent wheatgrass	4.00
Reliant	foundation	intermediate wheatgrass	4.00
Mandan 759	foundation	pubescent wheatgrass	4.00
Native Forbs/Legumes			
Bismarck germplasm	select (G1)	narrow-leaved purple coneflower	100.00
Bismarck germplasm	select (G1)	purple prairieclover	40.00
Bismarck germplasm	select (G1)	stiff sunflower	100.00
Medicine Creek germplasm	select (G1)	Maximilian sunflower	50.00

*Generation number for select class material is shown in parentheses (G1 = generation 1).

**Bismarck Plant Materials Center
Long Range Plan 2001-2005**

PLANT MATERIALS NEEDS AND PRIORITIES SUMMARY

Native Prairie Ecosystems Restoration

- identify additional species
- develop propagation, enhancement, establishment, and management technology
- develop sources

Wetland and Riparian Plant Materials

- identify additional species
- develop propagation, enhancement, establishment, and management technology

Streambank and Lakeshore Stabilization

- identify suitable species
- develop establishment and management technology

Tree and Shrub Related Technology

- increase species diversity and adapted varieties
- windbreak improvement and renovation
- need additional tall tree species
- need improved native shrub species

Warm-Season Grass Promotion and Development

- identify species for critical areas and develop technology
- document and promote forage quality
- develop proven management techniques

Saline/Alkaline Tolerant Plant Materials

- identify woody/herbaceous species and develop establishment technology

Filter Strips/Nutrient Management

- document methods of nutrient uptake
- promote effective plants for waste management systems

Urban Conservation

- promote effective species/varieties
- promote effective establishment and management technology
- promote environmental benefits
- promote backyard conservation

Alternative Income Plants

- promote agroforestry
- promote potential high income species
- identify species and technology

Information and Education

- identify and promote perennial plants for wildlife food plots
- remarket old plant releases
- promote big bluestem as high quality warm-season pasture
- identify specific outreach opportunities

2002 Field Season Calendar of Activities

The following calendar of plant materials activities is for your information and participation, whenever possible. Dates and activities are subject to change.

Date	Personnel	Location	Activity
April 18-19	Tober, Jensen	Fargo, ND	Sedge trial planting
April 30-May 2	Tober, Halko, Jensen	Grafton, ND	Weinlaeder riparian planting
May 6-10	Knudson	Bottineau, Dickinson, ND	Plant woody FEPs
May 6-10	Tober	Highmore, SD; Morris, Becker, MN	Plant woody FEPs
May 13-17	Tober	Staples, Grand Rapids, MN	Plant woody FEPs
May 29-31	Tober, Jensen	Fargo, ND	Plant forbs/legumes, Conservancy Park
June 3-5	Tober, Stange, Halko, Weston	Walhalla, Grafton, ND	EWP grass seeding review
July 8-12	Tober, Stange, Knudson	Walhalla, Cavalier, ND	Direct woody evaluation and Linstad cordgrass planting
July 16-18	PMC staff, ES staff	Bismarck, ND	Plant Materials training
July 23-24	PMC staff, Tober, Senechal, Jewett	Bismarck, ND	State Conservationists' Advisory Committee meeting
July 25-26	ND PM Committee members	Washburn, ND	Prairie revegetation tour
August 5-9	Tober	Perham, MN and selected field offices	Field Planting review
August 19-23	Tober, Stange	Selected field offices	Field Planting review
September 3-5	Tober, Duckwitz	Pierre, Highmore, SD; Hettinger, ND	Grass and tree plot evaluation
September 3-6	Knudson	Bottineau, Dickinson, ND	Woody FEP evaluation
September 16-20	Printz, Tober	Selected field offices	Grass seeding review
September 23-25	Tober, Duckwitz	Owatonna, MN	Organic soils grass evaluation
September 30-October 4	Stange, Tober	Selected field offices	Tree care workshops
October 15-16	PMC staff, Tober, Senechal	Fargo, ND	Variety release committee

2001 Staffing/Advisors

PMC Advisory Committee

Thomas Jewett, State Conservationist, North Dakota
 Janet Oertly, State Conservationist, South Dakota
 William Hunt, State Conservationist, Minnesota

State Contacts

Myron Senechal, SRC, North Dakota
 Ronald Nadwornick, SRC, South Dakota
 Greg Yapp, RC, South Dakota
 Paul Flynn, Forester, Minnesota
 Jim Ayres, ASTC (FO), Minnesota

Plant Materials Specialist

Dwight Tober, Bismarck, North Dakota

Bismarck PMC Staff

Wayne Duckwitz, Manager/Range Conservationist
 Michael Knudson, Assistant Manager/Forester
 Nancy Jensen, Agronomist
 Rachel Bergsagel, Biological Technician
 Earl Aune, Biological Technician/Field Foreman
 Danita Gebeke, Secretary
 Michael Bellon, Seed Processing Technician
 Barrett Berube, Seasonal WAE
 Jack Biesterfeld, Seasonal WAE
 Lindy Hagens, Seasonal WAE
 Jennifer Harmon, Seasonal WAE
 Jerry Monroe, Seasonal WAE